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First Named Inventor: MERRY, RICHARD P.

Application No.: 10/823852

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Group Art Unit 1797

Title: MULTILAYER MATS FOR USE IN POLLUTION CONTROL DEVICES

BRIEF ON APPEAL

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September 2, 2008	/Jessica L. Nolan/
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Dear Sir:

This is an appeal from the Final Office Action mailed on March 28, 2008, finally rejecting claims 1-16 and 18, 19 and 21, and in light of the Advisory Action mailed August 18, 2008.

A Notice of Appeal in this application was mailed on June 30, 2008, and was received in the USPTO on June 30, 2008. The due date for this Appeal Brief is September 2, 2008, because August 30, 2008 was a Saturday and September 1, 2008 was a government holiday.

Appellants request the opportunity for a personal appearance before the Board of Appeals to argue the issues of this appeal. The fee for the personal appearance will be timely paid upon receipt of the Examiner's Answer.

Fees

- ☐ Any required fee under 37 CFR § 41.20(b)(2) will be made at the time of submission via EFS-Web. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.17 which may be required to Deposit Account No. 13-3723.
- ☐ Please charge any fees under 37 CFR §§ 37 CFR § 41.20(b)(2) and 1.17 which may be required to Deposit Account No. 13-3723.
- ☒ Please charge any additional fees associated with the prosecution of this application to Deposit Account No. 13-3723. This authorization includes the fee for any necessary extension of time under 37 CFR § 1.136(a). To the extent any such extension should become necessary, it is hereby requested.
- ☒ Please credit any overpayment to the same deposit account.

REAL PARTY IN INTEREST

The real party in interest is 3M Company (formerly known as Minnesota Mining and Manufacturing Company) of St. Paul, Minnesota and its affiliate 3M Innovative Properties Company of St. Paul, Minnesota.

RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any related appeals or interferences.

STATUS OF CLAIMS

Claims 1-16 and 18-21 are pending. Claim 17 was previously canceled, without prejudice or disclaimer. Claim 20 was previously withdrawn from consideration. Claims 1-16, 18, 19 and 21 stand rejected.

STATUS OF AMENDMENTS

No amendments have been filed after the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The claims of the present invention at issue in this appeal concern a multilayer mat comprising a non-intumescent layer sandwiched between two intumescent layers, as well as a pollution control device that includes such a multilayer mat positioned between a metal housing and a pollution control element.

(Pages And Lines Relate To The Specification, As Filed, Unless Otherwise Stated)

CLAIM 1

Independent claim 1, and claims 2 to 9 which are dependent thereon, concern a multilayer mat (see e.g., Ref. Nos. 30, 50, 100 and 250, Figs. 1-4; page 4, lines 4-17; page 25, lines 18-22; page 26, lines 3-6; and page 27, line 29 to page 28, line 1) comprising: a non-intumescent layer comprising inorganic fibers (see e.g., Ref. No. 120, Fig. 1; page 4, lines 25-28; and page 4, line 30 to page 5, line 5); a first intumescent layer forming a first outer layer of the multilayer mat

(see e.g., Ref. No. 110, Fig. 1; page 4, lines 18-24; and page 15, line 11 to page 16, line 11); and a second intumescent layer forming a second outer layer of the multilayer mat (see e.g., Ref. No. 130, Fig. 1; page 4, lines 18-24; and page 15, line 11 to page 16, line 11), wherein the non-intumescent layer is positioned between the first intumescent layer and the second intumescent layer (see e.g., Fig. 1; and page 4, lines 4-17).

CLAIM 10

Independent claim 10, and claims 11-16, 18, 19 and 21 which are dependent thereon, concern a pollution control device (see e.g., Ref. Nos. 10, 40 and 200, Figs. 2-4; and page , lines) comprising: a first metal housing (see e.g., Ref. Nos. 11, 44 and 240, Figs. 2-4; and page , lines); a pollution control element inside the first metal housing (see e.g., Ref. Nos. 20, 42 and 230, Fig. 2-4; and page , lines.); and a multilayer mounting mat positioned between the first metal housing and the pollution control element (see e.g., Ref. Nos. 30, 50, 100 and 250, Figs. 1-4; page 4, lines 4-17; page 25, lines 18-22; page 26, lines 3-6; and page 27, line 29 to page 28, line 1). The multilayer mounting mat comprises: a non-intumescent layer comprising inorganic fibers (see e.g., Ref. No. 120, Fig. 1; page 4, lines 25-28; and page 4, line 30 to page 5, line 5); a first intumescent layer forming a first outer layer of the multilayer mat (see e.g., Ref. No. 110, Fig. 1; page 4, lines 18-24; and page 15, line 11 to page 16, line 11); and a second intumescent layer forming a second outer layer of the multilayer mat (see e.g., Ref. No. 130, Fig. 1; page 4, lines 18-24; and page 15, line 11 to page 16, line 11), wherein the non-intumescent layer is positioned between the first intumescent layer and the second intumescent layer (see e.g., Fig. 1; and page 4, lines 4-17).

CLAIM 11

Dependent claim 11 concerns the pollution control device of claim 10 and further comprises a second metal housing (see e.g., Ref. No. 280, Fig. 4; and page 27, line 25 to page 28, line 6) surrounding the first metal housing, wherein an exhaust gas passes between the first metal housing and the second metal housing (see e.g., Fig. 4; and page 27, line 9 to page 28, line 6).

GROUND OF REJECTION TO BE REVIEWED ON APPEAL**First Ground of Rejection**

Claims 1-10, 12-16 and 19 stand rejected again under 35 USC § 103(a) as being unpatentable over Langer et al. (US Patent No. 6,458,418 B2).

Second Ground of Rejection

Claims 11, 18 and 21 stand rejected under 35 USC § 103(a) as being unpatentable over Langer et al. (US Patent No. 6,458,418 B2) in view of Papadopoulos (US Patent No. 4,362,016).

ARGUMENT**First Ground of Rejection**

Claims 1-10, 12-16 and 19 stand rejected under 35 USC § 103(a) as being unpatentable over Langer et al. (US Patent No. 6,458,418 B2).

In arguing for this rejection, the Final Office Action and the subsequent Advisory Action indicate that it would have been obvious to the person of ordinary skill in the art to make a multilayer mat with a non-intumescent layer positioned between two intumescent layers. In support of this position, the Final Office Action and the Advisory Action refer to column 4, lines 5-6 and column 15, lines 60-64 of Langer et al., which state respectively:

The layer adjacent the metal housing contains an intumescent material.

The present invention also contemplates intumescent sheets having three or more layers wherein at least one layer comprises an intumescent material and wherein adjacent layers are desirably comprised of different compositions.

In the Final Office Action, these passages from Langer et al were interpreted as teaching that "if there are three layers to be used as mounting mat" and if "two are intumescent layers and one is non-intumescent layer, there are only two ways to construct a mounting mat." The Final Office Action goes on to argue that one construction would have the two intumescent layers next to each other, and the other construction would have the non-intumescent layer between the two intumescent layers. In the Advisor Action, the above passages from Langer et al. were interpreted more restrictively as teaching that: "Since the layer adjacent to the metal housing

contains an intumescent material, the non-intumescent layer will be positioned in between the two intumescent layers to form a multilayer mat of intumescent/non-intumescent/intumescent.” (Emphasis Added) It is respectfully submitted that the Examiner misinterprets the teaching of Langer et al.

Please note that Langer et al. do not disclose any specific three layer mat construction. As noted above, the single express disclosure to a three layer mat in Langer et al. (see column 15, lines 60-64) only requires the mat to include at least one layer comprising an intumescent material. In addition, there are only three basic mat constructions expressly disclosed by Langer et al., and each one is a two layer construction. One construction has an Intumescent layer and a Non-Intumescent layer (e.g., see Examples 1, 3 and 11-14), another construction has two Intumescent layers (e.g., see Examples 2 and 4-6), and the third construction has two non-intumescent layers (see Example 10). There is also no requirement that the Langer et al. mat have a layer containing an intumescent material on the outside of the mat (i.e., located adjacent the metal housing of the pollution control device). The passage cited in the Final Office Action and Advisory Action (column 4, lines 5-6) refers only to “one aspect” of the Langer et al. invention, and therefore, this is not a required feature of the Langer et al. invention. In fact, the Langer et al. invention is not even limited to multilayer mats that include a layer comprising an intumescent material (e.g., see Example 10, claims 1, 11 and 12, and column 1, lines 16-21). With this in mind, the broad teachings in Langer et al. apply to any number of mat constructions, with or without a layer of intumescent material.

Even if a Langer et al. three layer mat was found to be limited to having at least one layer with intumescent material, which is denied, there are at least six possible mat constructions, other than the mat construction recited in the present claims (i.e., Intumescent/Non-Intumescent/Intumescent). The other six possible general combinations of layers are as follows (where the layer on the right is against the metal housing):

- Non-Intumescent/Intumescent/Intumescent;
- Intumescent/Intumescent/Non-Intumescent;
- Non-Intumescent/Non-Intumescent/Intumescent;
- Intumescent/Non-Intumescent/Non-Intumescent;
- Intumescent/Intumescent/Intumescent; and

Non-Intumescent/Intumescent/Non-Intumescent.

These facts were not taken into consideration by the Examiner in the arguments set forth in the Final Office Action and the Advisory Action.

The Final Office Action and Advisory Action conclude that it would have been obvious, based on the above cited generic teaching in Langer et al., for the person of ordinary skill in the art to try to make a multilayer mat with a non-intumescent layer positioned between two intumescent layers. It is submitted that the Examiner has failed to prove a prima facie case of obviousness. MPEP § 2143 describes the prerequisites for proving a prima facie case of obviousness based upon an "Obvious To Try" rationale. In particular MPEP §2143E states, in pertinent part:

To reject a claim based on this rationale, ... Office personnel must articulate the following:

- (1) a finding that at the time of the invention, there had been a recognized problem or need in the art, which may include a design need or market pressure to solve a problem;
- (2) a finding that there had been a finite number of identified, predictable potential solutions to the recognized need or problem;
- (3) a finding that one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success; and
- (4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

... If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art. (Emphasis Added).

The Final Office Action failed to identify any "recognized problem or need in the art" that would have motivated the person of ordinary skill in that art to make a multilayer mat as recited in the present claims. The Advisory Action attempts to address this shortcoming and satisfy this requirement by pointing to two problems identified in Langer et al.. One of these problems relates to the pressures applied by conventional intumescent mounting mats that can damage extremely thin wall monoliths (i.e., column 2, lines 50-67), and the other problem relates to the relative high cost of using intumescent materials to make mats (i.e., column 3, lines 45-51).

Langer et al. indicates, however, that these problems can be solved by using any multilayer mat construction according to their invention. For example, in column 4, lines 15-17, Langer et al. expressly disclose that their inventive multilayer sheet can be made to "expand and intumesce over specific temperature ranges using relatively less intumescent material ..." The pressures exerted by a mounting mat can be controlled by controlling when the mat expands and intumesces, and reducing the amount of intumescent material used can reduce the overall cost of the mat. In addition, as noted above, Langer et al. does not disclose any three layer, or more, mat construction, let alone the present claimed multilayer mat construction (i.e., Intumescent/Non-Intumescent/Intumescent).

Therefore, Langer et al. provides no disclosure, teaching or suggestion to produce a mat, as presently claimed, with a non-intumescent layer positioned between two intumescent layers. In fact, Langer et al. do not even disclose or teach the use of two intumescent layers with one non-intumescent layer. In addition, Langer et al. do not identify any problem or need in the art that would be solved by the present inventive mat construction, and the problems identified in Langer et al. by the Advisory Action are problems that Langer et al. teaches can be solved by using various two layer mat constructions. The only source disclosing a multilayer mat having a non-intumescent layer positioned between two intumescent layers, and the only source identifying a need for such a mat construction is the present application. As a result, according to MPEP §2143E, the Office Action and Advisory Action fail to meet the burden of proving a prima facie case of obviousness for claims 1-16, 18, 19 and 21. Accordingly, the rejections of claims 1-16, 18, 19 and 21 under 35 USC § 103(a) should be reversed and the claims allowed.

Second Ground of Rejection

Claims 11, 18 and 21 stand rejected under 35 USC § 103(a) as being unpatentable over Langer et al. (US Patent No. 6,458,418 B2) in view of Papadopoulos (US Patent No. 4,362,016). In response to Appellant's previous argument that Papadopoulos is directed to a pollution control device that does not employ any form of mounting mat, the Final Office Action states that:

... the pollution control device of Papadopoulos has structure (intake and exhaust pipes) in which the pollution control device of Langer et al. can be employed for reducing pollution of the atmosphere.

In support of the rejection of claim 11, the Final Office Action further states:

Langer et al. reference discloses the pollution control device of claim 10 and its use on motor vehicles except which part of the motor vehicles the pollution device are employed on. It would have been obvious ... to install the pollution control device on a muffler in an automobile exhaust line of Papadopoulos (inside of intake and exhaust pipe — Figure 1, numerals 5 and 6) for reducing pollution of the atmosphere. (Papadopoulos-Figure 1, Abstract and Column 2, Line 54-57).

In addition to the arguments raised above relative to Langer et al., it is submitted that the Final Office Action also fails to overcome its burden of proving a prima facie case of obviousness with regard to this second ground for rejection. As best as can be determined from the statements made in the Final Office Action, it appears that the Examiner believes the invention of claim 11 will result by installing a catalytic converter or exhaust filter, like that disclosed in Langer et al., onto or inside of the intake pipe (5) or exhaust pipe (6) of the Papadopoulos muffler. It is respectfully submitted that the invention of claim 11 will not result.

Claim 11 recites that the pollution control device of claim 10 further comprises “a second metal housing surrounding the first metal housing, wherein an exhaust gas passes between the first metal housing and the second metal housing.” (Emphasis Added) According to claim 10, a pollution control element is located inside the first metal housing and a multilayer mounting mat is positioned between the first metal housing and the pollution control element. Therefore, in order for the invention of claim 11 to result, the pollution control device would have to be positioned inside of the outer metal housing (2) of the Papadopoulos muffler, not inside its intake pipe (5) or exhaust pipe (6), which are located outside of housing (2) (see Fig. 1).

In addition, Papadopoulos is directed to an alternative pollution control devices (e.g., an alternative to a catalytic converter), and Papadopoulos expressly teaches away from using such pollution control devices, like a catalytic converter, with or in his invention. See, e.g., column 1, lines 19-31 and lines 52-56, which state:

By reason of the large number of automobiles operated in congested areas such as large cities, pollution of the atmosphere by the automobile exhaust gases has become an increasingly serious problem. Many efforts have been made to decrease such pollution. Among such efforts is the installation of a catalytic converter in the exhaust line of the vehicle. However, a catalytic converter is an expensive piece of equipment which materially increases the cost of a car on which it is installed. Moreover, it is not wholly

effective or reliable. A further disadvantage is that it requires the use of unleaded gasoline and thereby reduces the performance of the car.

Thus although the problem of reducing pollution of the atmosphere by automobile exhaust gases has long existed and although many proposals have been made, no simple, effective and economically feasible solution to the problem has been found.

It is submitted that the only teaching or suggestion to use a pollution control device like that disclosed in Langer et al. (e.g., a catalytic converter) inside a muffler, or inside any other device as recited in claim 11, is found in the present application and not in Papadopoulos or any other reference of record in this case. Therefore, as a result, it is respectfully submitted that the Final Office Action failed to meet its burden of proving a prima facie case of obviousness for claim 11. Accordingly, the rejection of claims 11, 18 and 21 under 35 USC § 103(a) as being unpatentable over Langer et al. in view of Papadopoulos should be reversed and the claims 11, 18 and 21 allowed.

It is also submitted that there are other limitations recited in the claims, in addition to those discussed above, which further distinguish the claimed invention patentably from the cited art and the other art of record. These additional distinguishing limitations were not discussed because there is no need to do so at this time.

CONCLUSION

For the foregoing reasons, appellants respectfully submit that the Examiner has erred in rejecting this application. Please reverse the Examiner on all counts.

Respectfully submitted,

9/2/08
Date

By: 

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CLAIMS APPENDIX

1. A multilayer mat comprising:
a non-intumescent layer comprising inorganic fibers;
a first intumescent layer forming a first outer layer of the multilayer mat; and
a second intumescent layer forming a second outer layer of the multilayer mat,
wherein the non-intumescent layer is positioned between the first intumescent layer and the second intumescent layer.
2. The multilayer mat of claim 1, wherein the first intumescent layer and the second intumescent layer each comprise an intumescent material selected from vermiculite, expandable graphite, or combinations thereof.
3. The multilayer mat of claim 1, wherein the non-intumescent layer has a thickness that is at least 50 percent of a total thickness of the multilayer mat.
4. The multilayer mat of claim 1, wherein the non-intumescent layer is thicker than the first intumescent layer and the non-intumescent layer is thicker than the second intumescent layer.
5. The multilayer mat of claim 1, wherein the inorganic fiber comprises a ceramic fiber having a bulk shrinkage no greater than 10 percent.
6. The multilayer mat of claim 1, wherein the inorganic fibers comprise glass fibers.
7. The multilayer mat of claim 1, wherein the inorganic fibers comprise glass fibers and both the first and second intumescent layers comprise vermiculite.
8. The multilayer mat of claim 1, wherein the inorganic fibers comprise a ceramic fiber having a bulk shrinkage no greater than 10 percent and both the first and second intumescent layers comprise vermiculite.

9. The multilayer mat of claim 1, wherein two or more layers of the multilayer mat are bonded together with an adhesive, needle bonding, or stitching.
10. A pollution control device comprising:
a first metal housing;
a pollution control element inside the first metal housing;
a multilayer mounting mat positioned between the first metal housing and the pollution control element, said multilayer mounting mat comprising:
a non-intumescent layer comprising inorganic fibers;
a first intumescent layer forming a first outer layer of the multilayer mat; and
a second intumescent layer forming a second outer layer of the multilayer mat,
wherein the non-intumescent layer is positioned between the first intumescent layer and the second intumescent layer.
11. The pollution control device of claim 10, further comprising a second metal housing surrounding the first metal housing, wherein an exhaust gas passes between the first metal housing and the second metal housing.
12. The pollution control device of claim 10, wherein the non-intumescent layer has a thickness that is at least 50 percent of the total thickness of the multilayer mat.
13. The pollution control device of claim 10, wherein the non-intumescent layer is thicker than the first intumescent layer and the non-intumescent layer is thicker than the second intumescent layer.
14. The pollution control device of claim 10, wherein the inorganic fibers comprise ceramic fibers having a bulk shrinkage less than 10 percent.

15. The pollution control device of claim 10, wherein the inorganic fibers comprise glass fibers.
16. The pollution control device of claim 10, wherein the inorganic fibers comprise glass fibers and both the first and second intumescent layers comprise vermiculite.
18. The pollution control device of claim 11, wherein the pollution control element is a diesel particulate filter.
19. The pollution control device of claim 10, wherein the mounting mat has sufficient holding pressure at operating temperatures both higher than and lower than a temperature suitable for expanding the first and second intumescent layers.
21. The pollution control device of claim 11, wherein the pollution control element is a catalytic converter element and the pollution control device is a catalytic converter.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.